Designing the New School

By J.V. Bolkan, Jennifer Roland, and Davis N. Smith

Lots of things have changed since the baby boomers began overfilling postwar schoolhouses in the 1950s. The sparkling new buildings erected across the United States to handle the population surge have lost their luster, and in many cases, their functionality. This isn't new information; in a 1995 General Accounting Office report, nearly half of U.S. schools lacked the basic wiring to support computers, modems, and other modern communication technology. In the decade since that report, infrastructure needs have expanded dramatically. Replacing these buildings has become a priority for school districts. Eugene, Oregon's 4J district is fairly typical. It plans to open its fourth replacement school in as many years when the 2006–07 school year begins, and *L&L* staff visited the two newest buildings in the district.

Madison Middle School opened in fall 2005, and across town the new Cal Young Middle School is taking shape in the shadow of the current building. District and site-based staff were extremely gracious with their time as we toured Madison days before its opening and later took a rainy tour through the

PHOTOS BY TAMARA KIDD AND BETH SCANDALIOS

Cal Young construction site. Many of the lessons and insights the various participants shared with us should be of interest to personnel in other districts embarking on similar building projects.

Modern Needs for Modern Schools

Although a new school building shares almost all the obvious characteristics of one built in the 1950s—or even the 1920s—the infrastructure needs of 21st-century students and teachers have changed dramatically. In the 1950s, television was still relatively young, and its potential as an educational technology almost unimagined. Computers were still nearly as large as an entire school, and they were years from being introduced to students. The predominant technologies were the chalkboard, filmstrip, and movie projector. A modern school needs to have a robust network structure that can be easily upgraded, plenty of electrical outlets, rich multimedia and communication features, and safety and security equipment. It also needs to be accessible to a much higher degree than was common in the 1950s and incorporate modern design and ergonomic factors. And, it must still be designed to last through 40 or 50 years of hard use. Finally of course, it had better fit inside the inevitably tight budget.

At Madison, common areas were designed to allow pods of students to congregate and collaborate.

Joel Lavin, a science teacher at Madison who was part of his school's design team, says that planning for forward-thinking uses of technology is critical to a tech-integrated school's success.

"Teachers are mainly using computers for literacy, Internet research, and presentations," Lavin says. "We want to get kids doing presentations to each other. We want kids to use Inspiration for reading and reporting skills. All kids have e-mail. All kids have wireless access. We are trying to get them to interact more with each other electronically at school. We know they interact out of school electronically already."

Although details will change from district to district, many of the challenges encountered and lessons learned in 4J are likely to be repeated in other regions. For instance, the need to balance staff, student, and community expectations within a budget is a universal concern. Getting input from all these stakeholders is only part of the equation; weighing the importance of stakeholder opinion is much trickier. "It's all about the students," may sound very noble, but if a district shortchanges the needs of the staff so that they can't efficiently teach, how well are the students really being served?

Likewise, satisfying teachers and other staff but alienating the community can lead to long-term problems in a public school system. Ensuring that children with diverse experience with technology have robust access is vital.

"As I work with my students more, I notice a clear digital divide," Lavin says. "Kids with iPods, picture phones, and so on have integrated computers in their lives in the classroom and out of it. Kids without these things have a harder time using technology in the regular classroom."

It is easy to over-focus on computers and other digital equipment as the keys to the digital divide, but the fundamental technology of a school building can be a huge factor in closing or expanding the gap. For example, oft-ignored technology such as lighting and acoustical design can have concrete effects on student learning. According to studies by the California Board of Energy Efficiency, student test scores are 15% to 26% higher when classrooms are designed with daylighting. Likewise, student assessment results have shown to be closely tied to the acoustic properties of the classroom. Declines of nearly 30% in reading scores have been found when classrooms have poor acoustics. Both of the new middle schools were designed to bring maximum natural light into every classroom, and all classrooms are built with sophisticated multi-speaker sound systems that ensure consistent audio levels for all students throughout the room.

Because a new school is a multi-decade commitment with a large and diverse set of stakeholders, the pressure to do it right is intense.

Planning Is Crucial

Each of the new schools began with an exhaustive planning stage involving an advisory team composed of district and school staff, local parents, and districtwide community volunteers. Although each of the four replacement projects overlapped somewhat in their planning process, even fundamental decisions were made on each school independently. One community volunteer, Rodney Price, helped design the style of Madison's new building. "Madison was based on a classroom cluster theory, where subject matter rooms are grouped around a common area. The school district and Madison principal were

Madison Middle School Principal Nancy Pollard gave each of her teachers a Powerbook a year before the new building opened.

very committed to getting a modern school with outstanding classroom facilities and also accommodating the extras like band and athletics," which Price, a coach and former school band member, thought were important.

Opposed to a top-down philosophy, 4J's site-based schools are allowed to choose what technology to purchase, how it's used, and who uses it. But according to Kim Ketterer, 4J's educational technology district specialist, the site-based concept is far from purely implemented. The district houses network fileservers for the school in its central offices. Naturally,

COWs are an essential component of the district plan. Madison broke the shrinkwrap on theirs in September 2005.

with the district housing the actual fileservers for the schools, specifications for the fiber optic connections from the schools were made by district personnel. "Most of the input for infrastructure and networking actually came from the school district administration staff," Price says.

The district also offers staff training personnel, such as Ketterer, but district staff are only able to provide support and training on specific equipment and software. However, the major top-down influence is the districtwide commitment to online testing at every grade level. The district provides each elementary, middle, and high school a computers on wheels (COW) set with at least 15 Macintosh laptops so that students can be tested online. Although school staff can choose Macintosh, Windows, or handheld computers for use in their classrooms, the testing with the COWs is mandatory.

"Having COWs makes it possible to have students use spreadsheets and word processing for labs," says Angie Ruzicka, a science teacher at Cal Young, "and my two wireless laptops and a projector make it possible to access digital resources I didn't before, except for my own use."

Cal Young principal Sara Cramer shows off the design of her new building.

However, mandatory testing with COWs could also lead to bottlenecks.

"As more people want kids to use laptops, it is going to be frustrating to get access," says Ruzicka. "Right now I'm one of a small group that uses the COWs, so that has been nice. For it to be totally integrated you have to feel like you have access when you need it, and not have to change your instructional plan to fit availability."

A Tale of Two Sites

Because of the input from their respective advisory committees, the two middle schools, despite being opened within a year of each other and built by the same general contractor, are not twins. They do share several major technology elements. For instance,

Funding History

The genesis for these two schools was "a conversation [District 4J carried on] with our community that will help us develop a shared vision for education in Eugene," writes superintendent George H. Russell in his 1999 initial proposal for a Schools of the Future Committee (SOFC). The committee as Russell envisioned it would bring together education leaders, college of education faculty, students, parents, businesspeople, and members of the community to decide how education in District 4J should look in the 21st century.

The district supported Russell's vision and pulled together 29 community members, including

the mayor; the dean of the University of Oregon College of Education; representatives from the Chamber of Commerce, the Eugene Education Association, the Oregon School Employees Association, and the Eugene Administrators' Association; and school board members. They kicked off their project in September 1999 by inviting noted educational futurist Willard Daggett to speak. Daggett advised the SOFC to leave their expectations at the door and embark on the process with no prior assumptions.

The committee worked over the next 10 months to create a set of recommendations that guide a process to build new schools over the next three

decades throughout District 4J. The district then formed a Strategic Facilities Planning Advisory Committee (SFPAC) in March 2001. This 31-member group operationalized the recommendations the SOFC. This group's membership included principals, parents, students, facilities staff, a mechanical engineer, and a budget committee member.

The SFPAC placed a bond measure on the May 21, 2002, election ballot that included money for two new elementary school buildings and Madison and Cal Young Middle Schools. Voters approved the measure with 67.4% in favor, and the schools began their planning.

—*Jennifer Roland*

Built-in projectors in every classroom are already changing the way some teachers teach.

Madison made sure its music program benefitted from the state-of-the-art technology. They included acoustic tiles and speaker systems among traditional band equipment.

both schools are designed to provide full wireless networking throughout the building and surrounding grounds.

The commitment to robust networking, both wired and wireless, in the buildings was never seriously challenged. However, another feature common to both schools—projection systems in every classroom—was not so straightforward.

"We were hoping to have projection systems," says Madison principal Nancy Pollard. "However, the decision that we would in fact get them came very late in the building project. Teachers are in various stages of using their projection

systems. We will continue to provide training and collect and share ideas regarding best practices and uses." Each classroom includes a mounted NEC VT676 multimedia projector (reviewed in *L&L,* March 2006, p. 40).

Particularly in the elementary and middle schools, the most prevalent machines for staff are Apple Power-books. At Madison, creative budgeting and a strong belief in the value of technology enabled Pollard to purchase a Powerbook for every teacher a year before the new school opened. Total wireless coverage in the building has further increased the flexibility of the staff's laptop systems.

According to Ketterer, laptops are a key ingredient to getting full buy-in from teachers. "When they (teachers) can take the systems home, they

tend to learn and become more motivated to use the technology in the classroom." Ketterer also believes in providing as many digital cameras as possible to teachers, citing the creativity and enthusiasm the devices help foster.

The importance of staff buy-in and 4J's site-based emphasis have combined to differentiate the schools somewhat. Madison has an obvious emphasis on arts with a flexible, multi-use performance space and a high-tech, equipment-rich music room. Cal Young construction features an advanced multimedia lab and video emphasis.

Both Price and Grant Bowers, another member of the Madison planning team, worked with their kids to ensure that the new building would meet their needs. In fact, Bowers says he brought his daughters to some of the planning meetings. Price's younger son still attends Madison and, Price says, "is pleased with it." Price's older son and both of Bowers' daughters have since graduated, and all are jealous of the current students.

Rich Rewards

As with any new system, it takes a while to work the bugs out. "There are many glitches with our tech systems and wireless that we are working out with our district CIS folks," Pollard says. "I'm sure it will be a year of such glitches." Pollard says Madison's teachers and staff are working with district personnel, including Ketterer and others, to develop the school's technology plan, as well as activities and training as a part of the school's ongoing improvement plan.

Meanwhile, teachers and students at Madison and Cal Young are seeing benefits from the infusion of technology into the schools' planning from the ground up. According to Lavin, his

Construction on the new Cal Young building continues as students spend their final year in the old building.

Student-created art plays a part at Madison, from the chairs in the library to the tiles in the bathrooms.

21st-century classroom at Madison has already changed the way he teaches.

"It gives me more access to visual and auditory learners," Lavin says. "I can use a stereo system to reach kids in the back of my room. I can show movies that all can hear and see. I can teach research techniques on various search engines and encyclopedias that pop up all the time. I can use digital streaming media on demand, no video tapes required. I can find images for kids to use in the classroom for projects that are safe and copyright safe."

Jason Erickson, a sixth grade block teacher at Madison, agrees. "I am able to teach from various points in the room. I have a Bluetooth keyboard and mouse, and with the use of my laptop and overhead projector, I'm able to teach most of my lessons without using the white board. I'm mobile, and can easily roam about the room, instead of being stuck in the front."

"I can get kids to interact in a positive way with each other by sharing information," Lavin concludes. "I can have students give each other help technologically with projects. I'm using textbooks a little less, using the projection system a lot, and enjoying finding resources I never knew I could use before."

Financial Issues

Replacing a school building is an expensive and time-intensive project. Often, initial community support is ambivalent at best. Nostalgia for an old building, resistance to new or increased taxes, intra-district politics, and a host of other potential roadblocks are all factors a district must face when contemplating building a school on the ashes of an older one.

Ultimately, there really is no choice. Because a school building can have such a profound effect on student learning, parents with children in substandard facilities have been successful in bringing lawsuits against districts and states across the country, forcing them to upgrade schools. (***Editor's note:*** See Education Commission of the States briefing at http://www.ecs.org/clearinghouse/60/26/6026.htm.)

Another huge concern is the higher costs associated with older buildings. In addition to significantly higher maintenance costs, new schools are estimated to be at least 25% more energy efficient than older schools. In 2003, the U.S. Department of Energy estimated overall energy costs for operating schools at more than $6 billion annually. A potential savings of $1.5 billion a year in energy costs is significant, and with the cost of power already well above 2003 levels and expected to continue rising, many districts cannot afford to put off replacement projects.

Conclusions

Now more than ever, a school is much more than bricks and mortar. Approximately half of the school districts in the U.S. currently need to replace at least one school. The key to successful implementation begins long before foundations are laid. Strong direction from the district, heavy involvement from the community, and attention to the needs of school staff all are required to create buildings that will bring out the best in our students.

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